



Advanced Energy Machines, LLC
4245 E. Norcroft Street
Mesa, AZ 85215
602-321-4733
engineering@aem.green

April 23, 2018

Chair Mary Nichols and Members of the Board
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

Subject: Comments on Proposed Amendments to the Low Carbon Fuel Standard

Dear Chair Nichols and Members of the Air Resources Board

Advanced Energy Machines is pleased to share our comments on the proposed amendments to the Low Carbon Fuel Standard (LCFS) regulation. Advanced Energy Machines strongly supports the LCFS and efforts to encourage the use and production of cleaner low-carbon fuels.

Advanced Energy Machines (AEM) develops and manufactures zero-emission battery electric transport refrigeration units (TRU) with solar range extenders for refrigerated trailers. AEM has been running 50 prototype units in field testing in grocery and foodservice distribution fleets for development, validation and reliability testing in California over the past three years. AEM's advanced refrigeration systems have accumulated nearly 320,000 run hours, driven over 3,000,000 miles, and delivered several million cases while demonstrating excellent quality and reliability with four (4) fleets in revenue service. AEM's technology is coming to market to deliver an excellent return on investment for refrigerated fleets.

AEM supports the proposed amendment to include electric transport refrigeration units (eTRU). With our pleasure we submit these comments:

Electric Transport Refrigeration Units:

AEM applauds the inclusion of electric transport refrigeration units (eTRU) in the proposed amended regulation. We are pleased to see eTRU technology recognized for displacement of diesel fuel with the substitution of electricity as a clean, low-carbon way to deliver fresh, frozen, or perishable food.

Energy Economy Ratio (EER) for eTRU:

AEM agrees with the EER value proposed in the amended regulation of 3.4 as an appropriate value to establish eTRU as a new category in the LCFS. This value is appropriate for electric standby transport refrigeration where electric standby represents the majority of eTRU in the



ADVANCED ENERGY MACHINES

market today. Electric standby has been commercially available for over 15 years yet is not widely adopted.¹ The inclusion of eTRU in the LCFS can incentivize and expand the use of electric transport refrigeration in support of the California Sustainable Freight Action.

Energy Economy Ration (EER) for Advanced Technology eTRU

AEM recommends the establishment of a second EER for advanced technology electric transport refrigeration units (advanced eTRU) with Executive Officer approval. Advanced eTRU deliver temperature-controlled product with greater energy efficiency and zero-emissions throughout the entire delivery cycle and as such displace more diesel fuel per unit of electricity than conventional electric standby eTRU. Inherent breakthroughs in refrigeration system efficiency are achieved to enable battery electric TRUs to meet rigorous application requirements to provide in-route cooling solely from energy stored in a battery. Advanced eTRU should be rewarded with a higher EER for the greater displacement of diesel fuel.

AEM pledges to make data available to CARB staff to quantify and justify a higher EER than 3.4 so Executive Officer approval can be given for a higher EER for advanced eTRU.

* * *

AEM appreciates the opportunity to provide comments. Please do not hesitate to contact me with any questions. Thank you for your time and thoughtful consideration of this matter.

Sincerely,
Advanced Energy Machines


Ronald Koelsch, Ph.D.

¹ *Market and Technology Assessment of Electric Transport Refrigeration Units*. EPRI, Palo Alto, CA: 2015. 3002006036